GOLF CLUBHEAD

Technical field

The invention concerns the game of golf. It relates more specifically to metal golf clubheads which are used to execute short-distance shots. Clubs of this general type are referred to as wedges. The invention relates more particularly to characteristics of the strike face of such clubs which make it possible to improve their performance.

Prior art

The clubs called wedges are generally used for very short approach shots, or for shots in which a bell-shaped trajectory is sought. These include, for example, shots which are made to get the ball out of difficult lies, in particular out of bunkers. In a known manner, the strike face of these clubs has a very pronounced inclination relative to the vertical. The inclination of the strike face relative to the vertical, also called the loft angle, is generally greater than 45° on wedges. By means of this high loft, the trajectory of the ball is directed forwards but especially upwards, making it possible to execute the desired bell-shaped shots.

When shots are struck with wedges, the impact surface of the ball on the strike face of the clubhead is not perpendicular to the trajectory of the clubhead but instead has an inclination close to the loft angle. Given the friction existing between the ball and the strike face, the impact induces a movement of rotation of the ball upon itself. This movement of rotation of the ball upon itself is generally called backspin.

This backspin movement can be particularly useful for precision shots since it gives the ball a gyroscopic action which stabilizes its trajectory. This backspin movement can reach several thousands of rotations per minute.

Although this backspin movement reduces the length of the shots, it has the advantage of ensuring better control of the trajectory, which is particularly useful for short approach shots. This backspin movement also has the effect of limiting the travel of the ball after it hits the ground. This is because rebound is reduced, and it is even possible to see the ball stop completely when it touches the ground if there is enough backspin. In some cases when the backspin is even greater it is also possible to see the ball run back after hitting the ground.

It will be appreciated therefore that this backspin is particularly sought after when taking shots with wedges. The main object of the invention is to increase this backspin.

Different solutions have already been proposed in the past for increasing this backspin.

Thus, US 5,804,272 describes the possibility of coating the strike face of a club with an adhesive sheet covered by a material with a high coefficient of friction. More precisely, this is a layer of silicon carbide having a sufficient granulometry to ensure firm catching of the ball upon impact.

To increase backspin, another solution has been described in GB 1,062,796. More precisely, the solution described in said document consists in arranging on the strike face of the club a material which is abrasive or has a high coefficient of friction. By increasing the surface roughness of the strike face, it is possible to increase the degree of tangential force exerted on the ball upon impact.

JP 2000.254256 also describes another solution for increasing the backspin of clubs with a high loft angle. This solution lies in increasing the coefficients of friction of the strike face with the ball.

Conversely, while it is important to increase the backspin for irons with a high loft, it is preferable to reduce it for clubs with a low loft which are intended for long-distance shots. This is because, for these kinds of shot, the length of the shot is what matters, and the demands on precision are less important. In other words, the control permitted by backspin is less fundamental than it is for short approach shots. In view of this, JP 10 216 275 has described a process for treating the strike face of a club in which the strike face is polished and then carburized to increase its hardness. The combination of these two treatments makes it possible to greatly limit backspin and consequently to increase the distance of the shots.

The object of the invention is therefore to propose a new solution making it possible to greatly increase backspin for a club of the wedge type.

Description of the invention

The invention thus concerns a golf clubhead made from metal. This head has a strike face with a loft angle which is greater than 45°. The strike face includes a plurality of grooves formed on the strike face.

According to the invention, the strike face has a surface roughness (Ra) of less than 0.25 micrometre, and the Vickers hardness of the strike face is greater than 5 GigaPascal, and preferably greater than 12 GigaPascal.

In other words, the invention consists in subjecting the strike face of the wedge to very substantial polishing, while at the same time ensuring a very high degree of hardness.

Surprisingly, with the wedges having these characteristics, it is possible to very considerably increase the level of backspin, whereas it would have been expected that the level of friction between the

ball and the strike face would markedly diminish and that consequently the backspin would be reduced.

It should also be noted that the measures of reducing the surface roughness and increasing the hardness are used in JP 10 216 275 with the object of reducing the backspin. It is thus by employing a technique which is supposed to reduce backspin that we obtain the paradoxical effect of the invention, which is in fact an increase in this characteristic effect.

In practice it was observed that backspin was further increased when the surface roughness Ra of the strike face was less than 0.15 micrometre. This surface roughness can be determined in a standardized manner by application of standard ISO 4287. The surface roughness parameter Ra is defined more precisely as the arithmetic mean deviation of the surface roughness profile as defined in said standard.

This surface roughness is determined on the impact zone of the strike face. Thus, the strike face includes a plurality of grooves formed on the strike face, these grooves having a specific profile. In practice, it was found that the influence of the profile of these grooves, when they are present, is relatively insensible, and in particular with regard to the influence of the characteristic low surface roughness and hardness.

In addition, the strike surface is very hard, which limits deformations by crushing or hammering, and makes it possible to retain the appearance of a surface of very low surface roughness by virtue of a good resistance to wear and abrasion.

In practice, sufficient Vickers hardness coefficients have been obtained by producing the strike face using maraging steel. It will be recalled that maraging steels are steels which are tempered in the martensitic state, which thus contain very little carbon, and which are then hardened by reheating or tempering.

It is also possible to use other materials to obtain such a surface state, and in particular ceramic compositions such as in particular silicon carbide, boron carbide, titanium carbide, zirconium dioxide, alumina, and any combination of these materials.

In practice, it is advantageous to vary the surface roughness over the height of the strike face. Thus, with a strike face rougher in its lower part, and thus less rough in its upper part, a better performance in terms of increased backspin is observed.

Brief description of the figures

The manner in which the invention is achieved, and the advantages which derive from it, will become clear from the description of the following embodiment, with reference being made to the attached figures in which:

Figure 1 is a side view of a clubhead according to the invention.

Figure 2 is a front view of the head from Figure 1.

Realization of the invention

As has already been mentioned, the invention concerns a golf clubhead of the wedge type.

As is illustrated in Figure 1, such a head (1) has a strike face (2), on which the impact takes place, and a portion called the sole (3) and a rear face (4). This head (1) is continued laterally by a neck (5) intended to receive the shaft of the club (not shown).

On wedge clubs, the inclination α of the strike face (2) relative to the vertical (7) is greater than 45° and can be as much as 70°.

In the form illustrated in Figure 2, the strike face (2) has a plurality of parallel grooves (10) spaced apart from one another by a few millimetres.

As has already been mentioned, the club can be made using ceramic compositions to form the strike face. Good results have been obtained using silicon carbide. The strike face is polished until a surface roughness value of less than 0.25 micrometre is obtained. The Vickers hardness of such a strike face is of the order of 21 GigaPascal.

Thus, with the club described above, a number of practical tests have been conducted to determine the increase in backspin. These tests compared two clubs which were identical except for the characteristic polishing treatment. With a club which was not polished, thus having a surface roughness of the order of 1 to 3 micrometers, a back spin was observed corresponding to a rotation of just under 4000 rpm, with a specific type of balls.

With the same club having a surface roughness of less than 0.25 micrometre, corresponding to the invention, it is possible to increase the rotation of the ball (i.e. the backspin) of more than 60%, for a shot struck under the same conditions.

Tests were also conducted to quantify the influence of the invention on the trajectory of the ball after it hits the ground. The two clubs described above were used, in an unpolished version with a surface roughness of more than 1 micrometre and a polished version with a surface roughness of less than 0.25 micrometre.

Thus, in a first series of shots, and using the unpolished club, the ball travels an average distance of 46 centimetres beyond its point of impact with the ground. With this same club, and for the same series of shots, the ball recoils a distance of 90 centimetres from its point of impact with the ground, for the same club polished according to the invention.

In another series of shots, the ball remains very near the point of impact with the ground when the club is not polished. Conversely, in the same series of shots using the polished club, the ball recoils a distance of the order of 1.50 metres after its point of impact with the ground.

It will be evident from the above that the golf club according to the invention has the important advantage of very markedly increasing the backspin effect, which improves the control of shots taken with such wedges.

Giving the strike face a considerable hardness contributes to increasing this backspin and limits the deterioration of the surface condition of the strike face during the life of the club.